



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

215 Fremont Street

San Francisco, Ca. 94105

MAR 10 1987

MEMORANDUM

Subject: Technical review of aquifer exemption request by Berry Petroleum Company (Berry Ventures) for the Olcese Formation in the Poso Creek Oil Field, Kern County, California.

From: David P. Kyllonen, Hydrogeologist *David P. Kyllonen*
Policy, Standards and Technology Section W-6-3

To: Janet Hashimoto
Underground Injection Control Section W-6-2

Through: Bob Wills, Chief
Policy, Standards and Technology Section

In addition to my comments regarding the aquifer exemption request by Berry Petroleum Company (successor to Berry Ventures) I have included an attachment with comments to send to the Applicant regarding deficiencies in the aquifer exemption request. The attachment follows the general format of the draft aquifer exemption criteria check list and complements my comments below. Some comments may not appear both below and in the attachment.

*1) Ref. to S. 44 (2/10/87)
2) Freeman - South St (2/10/87)
unseen*

It is stated by the Applicant that because the Santa Margarita Formation has been used successfully and has caused no damage by vertical or lateral migration to waters of better quality and because the Olcese Formation is deeper it should be an adequate disposal zone and, therefore, should be exempted. This argument supplies no supporting evidence that the injected water will be contained within the confines of the Olcese Formation.

*Done
do 11/86
neg K2 WJA*

The Applicant states that the area being requested for exemption is not within the boundaries of any water district in Kern County. I find this hard to believe considering the value of water in the State of California. I would like to see a map depicting the boundaries of the water districts for this portion of Kern County.

I agree with the Central Valley Regional Water Quality Control Board's comment regarding the faults in the area. A memorandum from the Board to CDOG was included by CDOG in their recommendation to EPA. More information is needed on the faults to determine if they will act as barriers to ground-water flow. If the faults are barriers to flow this disposal zone has a finite amount of storage available. It may not serve as a disposal zone very long before the same problem occurs as has happened apparently with the current disposal zone, the Santa Margarita Formation.

problem - operators not aware

The CDOG Public Notice implies that the proposed exempted area is only that portion of the Olcese Formation in the Poso Creek Oil Field located within section 29, T 27 S, R 27 E. The Applicant stated that the "areal extent" being requested for exemption is approximately one square mile. The Poso Creek Oil Field Index Map supplied by the Applicant indicates this one square mile to be in portions of sections 28 and 29, T 27S, R 27E. Which square mile is being requested for exemption? To add further confusion Berry Petroleum Company responded to the Regional Board's comments and one of the comments to the Regional Board stated that only section 29, T 27S, R 27E was being requested for exemption.

4/12/28 27/28
w/12/29
As stated in application

Structural Cross-Section B-B' has no horizontal scale. This makes it difficult to determine how far the faults are away from the proposed exempted area and the proposed disposal well.

The Index Map for Structural Cross-Section B-B' appears to mark the wrong well as being the proposed injection well.

wrong (original name)

The Olcese Formation in the Poso Creek Oil Field does not meet the test for being a hydrocarbon producing zone. The Applicant states this up front, therefore other requirements for exemption must be met as per 40 CFR 146.4.

In Berry Petroleum Company's letter to David Clark, CDOG, it is stated that analyses were submitted of the Olcese Formation water and the produced water. Only the analysis of the Olcese Formation water was submitted to EPA. The analysis of the produced water needs to be submitted to EPA. Done see attached

The Poso Creek Fault is not identified on Structural Cross-Section B-B' as stated by the Applicant, nor is it shown on any map. In fact, none of the faults are shown on a map. Another important omission by the Applicant is the fact that the proposed exempted zone, the Olcese Formation, is not shown on a cross-section.

The Applicant and the CDOG emphasize several times each that the Olcese Formation waters will be "upgraded" because the disposal water has a lower TDS. But, what about down the road? Some other operator may have considerably higher TDS fluids and thus "degrade" the Olcese Formation waters. The Regional Board stated their concern about their policy of non-degradation of the State's waters. If the proposed exemption is approved maybe we should consider stipulating that waters of not greater than 10,000 mg/l TDS shall be injected into this well or any other wells in the future within the Poso Creek Oil Field. Better yet, stipulate that the injectate will not have a higher TDS value than the formation water. This could be applied to other exemption requests in the future too, of course.

4/20 note
4/24/28

Berry Petroleum Company states in their letter of March 19, 1986, to David Clark of CDOG the following: "The above geological description and attached cross-sections, we believe, clearly demonstrates that water movement will be from west to east. Furthermore, this regional geological evidence demonstrates that the volumes of water that will be injected from the Berry Petroleum Company Newhope lease can never (emphasis added) influence the ground waters to the east due to the sealing faults that prohibit its lateral migration. While we cannot definitely prove that these faults are barriers to ground-water movement, we can demonstrate that these faults are trapping faults with regard to hydrocarbons and certainly prevent the migration of oil. They most likely will confine the injected waters to the Olcese Formation in the immediate area". First of all, the information gives no demonstration that the water will move from west to east. The statement that the ground waters will never be influenced is a very strong statement. They admit that they cannot prove this but state that they can demonstrate the faults are barriers to hydrocarbon migration. If so, where is this proof. If, on the other hand, the faults do confine the injected water then the Olcese Formation will accept a finite amount of water without overpressurizing and may not be a very good disposal zone. This is the problem being faced by Berry Petroleum Company with the Santa Margarita Formation at this time.

A study of the impacts of injection should be required regardless of financial capability. If no study is conducted how can the Olcese Formation be determined to be an adequate disposal zone?

Based on what information was supplied by Berry Petroleum Company (Berry Ventures) and my arguments listed above I recommend denying the request for an aquifer exemption at this time. They can supply more information, such as that addressed in the enclosed attachment, and at that time the request can be further evaluated. Or, they can submit a new aquifer exemption request with the additional information included.

no proof, direction of flow, injection

if injecting, but have 2 also, spent prob.

Info. or comments
DPC → EPA

[Handwritten signature] *Don* *private* *analysis*

ATTACHMENT

The information supplied by the original applicant Berry Ventures and then Berry Petroleum Company the successor to Berry Ventures is insufficient to allow an adequate review for the aquifer exemption request. The following comments briefly state some of the areas of deficiency and in some cases includes suggestions for improvement.

- ✓ 1) The boundaries of the aquifer are not clearly delineated on a map. The approximate boundary of the Poso Creek Oil Field is shown but this boundary is somewhat arbitrary and is not a hydrogeologic boundary. *brief statement ... extensive* *see Exhibit* *Y-Mc. from Vol. 1 of Decree record*
- ✓ 2) The boundary of the proposed exempted portion of the aquifer is shown on the Poso Creek Oil Field Index Map. On the map the area is approximately one square mile. In the written portion of the request it is stated that the exemption is being requested for only that portion of the Olcese Formation within section 29, T 27S, R 27E. This confusion over what area is being requested for exemption needs to be clarified. *2 1/2 29, W 1/2 29*
- 3) The index map on the structural cross-section B-B' indicates some of the lease holders in the area but it does not include a listing of names and mailing addresses. This should be included for public notification if necessary. The list and map should identify all property owners and water rights holders. Include the water district boundaries on the map. *Asa*
- 4) The map showing the wells in the Poso Creek Oil Field is too difficult to read, a larger map would be more useful. In addition, this map should show well ID, type, depth, and status of at least all wells within the area overlying the portion of the aquifer proposed for exemption. *Field Map*
- 5) The geologic and hydrogeologic description of the Olcese Formation is inadequate. For example, the boundaries (upper, lower, lateral) of the Olcese Formation need to be defined more clearly with cross-sections, maps, and with a narrative discussion. The only cross-section with any detail, cross-section B-B', does not extend down to the Olcese Formation. The hydraulic properties of the Olcese Formation need to be provided along with more discussion and data, if possible, on the ground water flow rate and direction in the Olcese Formation.
- 6) A contour map showing the depth to the top of the Olcese Formation and the faults in the area should be included as a discussion of the areal extent of the Olcese Formation.

- 7) Information needs to be included about the confining zone overlying the Olcese Formation and its adequacy to confine the injected waste waters.
- 8) The reasons for requesting the exemption as given in 40 CFR 146.4 need to be addressed in greater detail.
- *9) An analysis for the produced water needs to be included to determine if the produced water is lower in total dissolved solids than the Olcese Formation water. *Done*

4/9/86

pg 2

also current injection zone prob.

Item 3 A.B.C.

4/14/87

To: Dave Clark
From: Janet Hashimoto

This is Dave Kyllonen's comments on Poso Creek aquifer exemption. We'll use this as points of discussion at 4/20 meeting.
(Copy sent to ~~Dave~~ Bob Reid)